

## ***RUNWAY SAFETY IS THE RESULT OF EFFECTIVE SURFACE RISK ASSESSMENT***

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In spite of all of the activities that the FAA has undertaken to reduce runway incursions, only marginal success can be achieved if personal accountability on the part of individuals remains unchanged. The human factor remains the most valuable and the most vulnerable asset in the aviation environment. Regardless of the seat one occupies, whether it be in the control tower, at the controls of an aircraft or the seat of a tug, fuel truck or vehicle, the individual must actively conduct a risk assessment associated with every transmission, every maneuver, every task at hand. It is quite possible that the exceptional aviation safety record in the USA has lulled many into the belief that the risk factor on an airport surface is so small that cognitive energies can safely be diverted to other concerns. After all, 338 runway incursions in 2003 with over 65 million landings and takeoffs at airports with control towers indicates that there is only 1 runway incursion for every 200,000 operations. But an article in a recent aviation publication reported “the likelihood of a collision with another aircraft, vehicle, pedestrian or other object while taxiing is about 3 times greater than the chance of striking another aircraft in flight.”<sup>1</sup> A personal effort should be undertaken to identify that risks do exist on the airport surface, analyze the cause of these risks, and then formulate some new personal safety practices in order to mitigate those risks that prevail.

On a one-runway operation, what is the potential for an incursion if only one aircraft is in the pattern or on the surface? There is no risk at all, assuming that there are no vehicles or pedestrians moving on the field. Now introduce a second aircraft. No, we don't have simply one possible scenario for an incursion; we have two. Aircraft A may make a mistake that introduces a safety risk to Aircraft B; however, Aircraft B can potentially do something unauthorized to cause a safety risk for aircraft A. Continue introducing more aircraft into the pattern and movement areas. With 3 aircraft there are 6 possible risks, 4 result in 12, and 5 aircraft can add up to 20 possible scenarios for a risk of an incursion. Now if you add such capacity enhancing procedures and operations as a parallel runway, simultaneous operations on intersecting runways, or intersection departures, the risk potential calculated above doubles. So a 5-aircraft operation on intersecting runways could have 40 possible scenarios of an incursion. Granted, only 16 out of 40 involve you if you are one of these aircraft. But if you are the air traffic controller, you must be alert for all 40 possible pilot deviations as well as being mindful of your own potential for contributing to the risk factor. The potential for disaster on an airport is sobering. This calculation makes the safety record even more impressive, but the overall purpose of this risk assessment is to identify the existence of incursion risks.

As one begins to analyze the causes behind these incursions there is an abundance of categories available for exploration. Adverse weather, the limitations of technology, and complex airport design are familiar contributing factors behind incursions. But by far the single greatest cause of this risk is the human-in-the-loop. We should begin with a statement of fact: well-trained and highly motivated people will make mistakes. We could add with reasonable assurance that poorly trained and un-attentive people will make more mistakes. There is quite an abundance of literature in both the behavioral science and

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<sup>1</sup>NBAA Journal of Business Aviation Safety, Volume 18, 2003, page 128

medical worlds that expound on the human error subject. For reasons of brevity in the article let this short summary serve as your launch pad for your own research or introspective analysis. The routine activities in aviation like leveling off while in a turn or taking off from the same airport for years can be executed without much thought given to it. Therein lies the hotbed for error. Movement on the surface of an airport cannot be taken for granted. Alertness and broad situational awareness are the vital elements in the prevention of a surface error.

In contrast to familiarity is a change to routine. Some people thrive on variety. But most of us, when knocked off of the center of our comfort zones, become very uneasy and do not perform as well. If we had a good foundation of basics from which we can draw upon, we will usually get by without anyone around us noticing our discomfort. But if our skills have long been displaced by our routines, our performance under the stress of unfamiliar territory will suffer.

To what extent you should go to mitigate incursion risks in your environment would depend upon the depth of your self-analysis. If you discovered that your personal risk for a surface deviation has been increased by some bad habits, this can be easily changed. For example, if you have slipped into a pattern of haphazard pre-flight planning to include failing to obtain and use airport diagrams even on your home airport, you can easily correct that by allowing yourself additional time in advance of your next trip to re-introduce those practices that your first flight instructor indoctrinated you with. But what if your problem is “expectation bias?” You heard tower say “hold.” You read back “hold.” But you crossed or took off anyway because that is what you “expected” to hear. This is easier to fix in two-member crews than in the single-piloted aircraft. Maybe it will take a handwritten note on the yoke or a shield on the throttle to serve as a final safety net that reminds you to clearly interpret what you’ve heard or quoted back to ATC before you spring into action.

Our risk assessment reveals that opportunities for incursions are numerous. For every incursion that actually occurred there were numerous others that were narrowly avoided and countless others that probably only one person knows was averted by a “chance” attention grabber. Make yourself personally accountable for the prevention of your own mistake, and be mindful that while you are doing everything by the book, there is possibly and airmen out there who is neither looking for you nor at you.